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How to transform and filter images using iterated function systems

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Abstract

We generalize the mathematics of fractal transformations and illustrate how it leads to a new approach to the representation and processing of digital images, and consequent novel methods for filtering, watermarking, and encryption. This work substantially generalizes earlier work on fractal tops. The approach involves fractal geometry, chaotic dynamics, and an interplay between discrete and continuous representations. The underlying mathematics is established and some applications to digital imaging are described and exemplified. © 2011 Society for Industrial and Applied Mathematics.

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Keywords

Dynamical systems, Fractal transformations, Iterated function systems